Plata. The results of Pasteur's experiments on "pig-typhoid" have also been criticised, and not without reason, by Prof. Klein. It is foolish for newspaper correspondents to attribute hesitation in accepting scientific results to jealousy. Much scrutiny will be necessary. Adverse criticism will be welcomed. M. Pasteur's fame stands in no need of artificial protection.

His past achievements are great: his last attempt was prudent in conception, and carried out with untiring zeal and admirable care. It deserves to succeed. If so, he will again receive the applause of the civilised world; if not, he will have the sympathy and respect of every pathologist.

It is melancholy to reflect that it would be practically impossible for any duly qualified man in England to repeat, to confirm, or to correct his results. We must wait till a wiser and more humane public opinion repeals the present restrictions upon investigations like Pasteur's.

TOPINARD'S "GENERAL ANTHROPOLOGY"

Éléments d'Anthropologie générale. Par le Dr. Paul Topinard. (Paris: A. Delahaye et É. Lecrosnier, 1885.)

THE study of anthropology has been pursued, especially of late years, with great zeal by many leading *savants*, both in the Old and New World, and many valuable contributions to our knowledge have been made in all departments included under its extensive range. This is more particularly the case with respect to that part of the subject which deals with the anatomical characters of the human body. Until this branch of anthropology was so vigorously and successfully studied by Broca, complete ignorance of many fundamental questions prevailed. The direct result of the work of that great anthropologist was immense, while the indirect result due to the incentive which he gave to the study of anthropology generally cannot be over-estimated, but may be inferred from the numerous societies devoted to its study which have rapidly sprung up in various countries. Broca must be considered the great pioneer of modern anthropology, but his untimely death left his work by no means complete, and many extensive fields remained almost untrodden by the foot of the investigator. By the accumulated observations of his followers these deficiencies have been in great part made good, and the time had arrived when it was possible to form generalisations from sufficient data, and when a comprehensive work embracing the whole subject was urgently needed. For the production of such a work no one more highly fitted could be found than Prof. Paul Topinard, trained at the feet of the great master himself, possessed of an extensive knowledge of his subject, and intimately acquainted, by personal visits to the chief centres of anthropological research, with the methods employed by his contemporaries.

The volume before us deals with the elements of general anthropology, and is the first part of Prof. Topinard's contemplated work, which, when completed, will consist of three parts, the second and third parts being devoted to special anthropology and a general survey of the whole subject, concluding with man's place in time, his origin and future.

Prof. Topinard begins by giving an historical account of the origin and development of anthropology, and claims that it is not a new science developed during the latter half of the present century, but that it has, during the last twenty years, attained its adult age and gained its independence.

He divides its history into different periods: (1) from antiquity till the year 1230, the date of the birth of human anatomy; (2) from 1230–1800, when anthropology asserted itself under the influence of Buffon, Blumenbach, Sœmmering, and White; (3) from 1800–1860, during which time three important events occurred that materially assisted its development—viz. the founding of the Society of Anthropology of Paris, the demonstration of the high antiquity of man, and the promulgation of the doctrine of evolution by Darwin. To these a 4th and more recent period is added—viz. that during which Broca's personal influence, aided by the advance of natural sciences, gave great impulse to anthropology. Each of these periods is considered in detail, and many matters of much interest are discussed.

Chapters VII. and VIII. are devoted to generalities including under this a definition of anthropology, its object and the subjects which it embraces. Anthropology is defined as the branch of natural history which treats of man and of the human race. It includes two distinct departments of study—viz. anthropology proper and ethnography; the former treating of the human species and its varieties or races from a purely animal aspect, and therefore essentially anatomical and physiological in its nature; the latter dealing with people and intimately connected with sociology. For the study of anthropology proper, anatomical and zoological knowledge is essential; but such knowledge is not necessary for the study of ethnography, as questions of race are excluded from it. Having discussed the various essential and accessory anthropological sciences, the place of anthropology in science, the meaning of the terms, "characters," "types," "races," "people," "nationalities," &c., he proceeds in the ninth chapter to consider general methods of anthropological research. The different kinds of physical characters and their study are first discussed. These are of three kinds—morphological and anatomical, descriptive and anthropometrical, and finally zoological and anthropological. After a few remarks on anthropometry, and on the comparison of measurement on the skeleton and on the living, which are stated to be not generally directly comparable, an observation which entirely agrees with our own experience, the subject of craniology is discussed, the various points on the skull to which it has been found convenient to give technical names are defined, and derivations and meanings of various terms such as "brachycephalic," &c., applied to skulls to express their form, are explained. In discussing the merits of instruments for measuring the skull, their simplicity is insisted upon. The elaborate instruments used in Germany, and by those who follow the German school (of which happily there are few) are very justly condemned. Broca's *compas d'épaisseur* and the *compas glissière* are figured and recommended. These are certainly simple, but, after considerable experience in their use, we rather take exception to the former, as not being very exact, on account of the measurements being read off on a scale reduced to one-half the actual length of the measurement. This may be avoided by using Flower's craniometer, which has the further advantage that it combines both Broca's instruments in one.

The consideration of the characters used in the classification of races is begun in the tenth chapter. The first of these discussed is the hair. A very concise *résumé* is given of the anatomy of the hair follicles and the development of hair, its distribution, size and form in various races. Six types of hair are described, and good illustrations of each are given. The characters of the nose are next considered. The anatomy of the soft and hard parts forming it are described and illustrated by means of beautifully executed woodcuts. The nasal indices of the skulls of various races are tabulated, and show clearly the value of the form of the nasal opening as a race character. In the living subject eight forms of nose are recognised and figured. All of these are easily distinguishable, and we would suggest the desirability of having cards with these forms printed separately for the use of travellers as a means of obtaining much more accurate information than we now obtain from descriptions of this part of the face, which are very frequently extremely vague and unsatisfactory. If furnished with such a card the traveller would be able to record the form of the nose by simply noting the number of the type to which the nose of each person examined corresponds. The table of nasal indices in the living will prove useful for comparison with those of the bony parts.

The colour of the skin, eyes, and hair are dealt with in the following chapter in the same systematic manner as the previous characters treated of. Prof. Topinard concludes that there are only two types—the blond and the dark; that the other so-called types—yellow and red in particular, can only in a very minor degree serve to distinguish races, and that colour as a rule is an uncertain character, liable to alter in individuals, and difficult to determine and express. As a concession, however, to the general practice, he gives a table of classification of races by their colour under the three denominations—white, yellow, and black.

The cephalic index, unlike colour, is described as a character of prime importance in the classification of races, since it indicates the general form of that portion of the skull which contains the brain. Before the cephalic index can have the same value in all cases, it is absolutely necessary that there should be complete uniformity in the manner of measuring the length and breadth of the cranium, the two measurements from which it is deduced. Unfortunately this has not hitherto been the case. French anthropologists have uniformly measured the cranial length as that between the most prominent points of the glabella in front and the occipital behind in the mesial line, and the breadth between the most widely distant points on the same plane of the parietal or squamosal bones at right angles to the length. This we contend is the only satisfactory method of measuring these diameters. In England the anterior point of length has been taken until recently from the ophryon, while in Germany the length is measured from the glabella to a point on a line perpendicular to the most posterior part of the occiput at right angles to a plane adopted by the Frankfort agreement as the horizontal of the skull. The breadth likewise has been differently measured on the parietal bones or on the squamosals. Fortunately the methods of measuring these diameters is uniform now in France, England, and most other countries, except Germany. Skulls are classified according to their cephalic indices into three groups—dolichocephalic, mesaticephalic, and brachycephalic; but the limits assigned to each group by different anthropologists vary very considerably, as the tables in Prof. Topinard's work will show. The limits assigned by the author to each group are such as to commend his classification generally. He subdivides the dolichocephalic and brachycephalic groups—the former into dolichocephalic and sub-dolichocephalic, and the latter into sub-brachycephalic and supra-brachycephalic, and gives these subdivisions and the mesaticephalic group each a limit of five units. Thus we have practically five groups—viz. dolichocephalic, where the index is between 65 and 69 inclusive; sub-dolichocephalic, 70-74 inclusive; mesaticephalic, 75-79 inclusive; sub-brachycephalic, 80-84 inclusive; and supra-brachycephalic, 85-89 inclusive. Skulls with indices below or above the extreme limits of these groups are termed ultra-dolichocephalic and ultra-brachycephalic respectively. This classification and the limits of each class agree with the ideas on the subject most generally entertained, and we would earnestly urge their acceptance. In one small point the nomenclature might be improved by the insertion of the word "sus," or in English supra, to distinguish the higher group of the dolichocephalic class (if its omission is not an overlook in the correction of the proof sheets of the work) so as to make the nomenclature of this subdivision correspond to that of the higher division of the brachycephalic class—"sus-brachycephalic." The tables of cephalic indices of skulls and of the heads of various races will prove extremely useful for reference.

Chapters XIII. and XIV. are devoted to stature. The development of the skeleton and its variations in height are first considered; then, secondly, the stature of the inhabitants of different countries. These chapters contain much information collected together from many sources.

The two following chapters treat of the weight and size of the brain at different ages, and in different persons and races, its relation to the weight and stature of the body, and other questions of much interest regarding it, which will well repay perusal by those interested in neurology as well as anthropologists.

The next chapter (XVII.), on the cubage of the cranial cavity, will be read with much interest, being a subject to which Prof. Topinard has given special attention. It reveals the great diversity of opinion which still exists regarding the best method of measuring the capacity of the encephalon. A system of cubage easy of application which would yield constant results in the hands of different operators, and at the same time indicate the actual size of the encephalon would probably be readily accepted by most anthropologists. Broca's system, which is perhaps the one most generally used, gives constant results, but is somewhat complicated and does not indicate the absolute capacity. Even with its faults Prof. Topinard considers it is the best method we have at present, he however contemplates some modifications of it which will simplify it and make it more satisfactory. This being the case it is needless to criticise the chapter further at present, but pass on to the next subject—viz. the skull itself, its measurements, and its characters—a most important part of the work, occupying ten chapters. In the limited space at our disposal it is impossible to enter into an examination of this part of the work adequate to its importance. When it is studied in conjunction with Broca's "Instructions Craniologiques," the results of more extended researches on a larger amount of material and more matured views are observable. Many measurements recommended by Broca in his work published in 1876 were abandoned by him before his death or delegated to a place of secondary importance. If any exception can be taken to this part of Prof. Topinard's work it is that it is too much an exposition of Broca's views to the exclusion of those of the author. Broca's methods are strictly adhered to in some instances where more independent consideration with knowledge acquired since his death might have resulted in a modification of the opinions expressed regarding them.

After discussing the general development of the skull and the relations between the configuration of the exterior of the cranium and of the brain, the measurements of the skull are considered. The skull is divided into a cranial and a facial portion, and the measurements of each are detailed and their relative importance pointed out. The measurements of the cranial portion recommended and the method of making them are those usually adopted; those of the facial portion, however, will give rise to some discussion. The ophryon of Broca is shown to be somewhat unsatisfactory in its determination; Prof. Topinard with much pains shows that a better point is the supercilliary point, which corresponds to the most anterior part of the brain, and is situated in the mesial line immediately above the glabella on the level of a line drawn horizontally above the supercilliary ridges. It seems to us absurd to give a second name to a point so closely corresponding to the ophryon, and we would consequently recommend that the definition of the "point intersourcilier" should be considered only as an amendment of Broca's definition of the ophryon. Natural or pathological and artificial deformities of the cranium and their effect on the brain are very fully and ably considered and illustrated by woodcuts. The vexed question of the proper plane of orientation of the skull receives due consideration, and the condylo-alveolar plane, which was determined by Broca after much research, is recommended as the best and simplest. Of all the positions proposed we also consider this the best, and hope to see it universally adopted. From the skull in this position the prognathism of the several parts of the face is easily determined by means of a vertical equerry and a small triangular one. Prof. Topinard finds that the prognathism which is most important in distinguishing race characters is the alveolo-subspinal, and he figures five different typical modifications of the form of the face in this region. In his remarks on Prof. Flower's method of indicating prognathism we think Prof. Topinard has misunderstood the object of selecting the basio-nasial line as the standard of comparison. This line is specially chosen as being as nearly as possible the primary line of development of the skull, and because it is more constant than perhaps any other measurement of the skull. By means of the indices measurements from the basion to the alveolar point, or to the sub-nasal spine, with the basio-nasial radius, the relative prominence of the various parts of the face can be easily expressed, and compared in different races. Though Prof. Topinard's method is perhaps the more strictly correct one, that of Prof. Flower has the advantage in being the more practical, from its being simpler.

We may here remark regarding certain measurements recommended by Prof. Topinard between the occipital point and various points on the face, with the object of indicating its profile outline, that we consider it would be preferable if the basion was selected as the starting point for them, instead of the occipital point, on account of the former being much more fixed than the latter. The relative proportion which these radii bear to one another according as the occipital point is situated high up or low down on the occipital bone is very great; indeed so much so as to render their indices almost valueless for purposes of comparison. This fact has probably been overlooked by Prof. Topinard in his desire to obtain a method of measuring the skull, which would be applicable also to the head of the living person.

In treating of the facial index, Prof. Topinard adheres to Broca's method of measuring the length of the face from the ophryon. This point we consider very unsatisfactory, as two observers will seldom place it at exactly the same spot. The facial height is best measured from the nasion, and we prefer the facial index of Kollmann to that of Broca. The lines of contour of the face are valuable in demonstrating the relative proportions of the upper and lower parts of the face to the maximum or bizygomatic width, and supplement the facial indices.

The number of measurements of the mandible have been much reduced by Prof. Topinard, and it is studied more in connection with the skull, as it should be, than as a mere isolated bone.

Chapter XXVII. contains a useful *résumé* of the various systems of measurements of the skull employed in Germany and England, a table of the measurements considered by the author to be of prime importance, and a more extended list to be used in making more minute researches. The method of orientation of the skull and of making measurements in relation thereto, advocated by the Frankfort agreement, is very justly condemned, but in an unoffensive and truly scientific spirit.

The last chapters of the work treat of the characters of the trunk and extremities, and contain valuable tables of the proportions of these parts of the body in different races. Throughout the work the characters in the living subject are carefully considered side by side with those of the skeleton, which is of great practical value not only to the anthropologist alone but to artists and others wishing to make themselves acquainted with the subject of human morphology.

The work concludes with a carefully drawn up table of directions and measurements of the body for the use of travellers, which will doubtless prove very valuable, and we hope will be the means of bringing us more exact information regarding the physical characters of many races yet imperfectly described.

The work is one in every respect worthy of the author, and cannot fail of being highly appreciated by anthropologists everywhere. We hope the time may not be far distant when the other volumes promised will be in our hands.

J. G. Garson